



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/014,550	12/14/2001	Wha Seop Lee	MR2685-105	3295

4586 7590 10/01/2003

ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043

EXAMINER

OCAMPO, MARIANNE S

ART UNIT	PAPER NUMBER
----------	--------------

1723

DATE MAILED: 10/01/2003

2

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/014,550

Applicant(s)

LEE ET AL.

Examiner

Marianne S. Ocampo

Art Unit

1723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Foreign Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. However, a certified copy of an English translation of the Korean document, KR 2001-3685, from which the benefits of priority based on 35 U.S.C. 119(a)-(d), has not been submitted. *Should applicant desire to obtain the benefit of foreign priority under 35 U.S.C. 119(a)-(d) prior to declaration of an interference, a translation of the foreign application should be submitted under 37 CFR 1.55 in reply to this action.*

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 – 3, 6 – 7, 10 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Chu et al. (US 2002/0175449).

4. With regards to claim 1, Chu et al. disclose a method for preparing a *thin fiber-structured polymer web* (defined by the examiner as a polymer web formed by thin fibers having diameters in nanometers), comprising the steps of:

- dissolving a polymer in a volatile solvent used as a polymer solvent to prepare a polymer solution;
- spinning the polymer solution by electrospinning; and,
- forming a thin fiber-structured polymer web cumulated on a collector (3), as in pages 1

- 12.

5. Concerning claims 2 - 3, Chu et al. also disclose the volatile solvent is at least one having a high volatility selected from the group consisting of acetone, chloroform, ethanol, isopropanol, methanol, toluene, tetrahydrofuran, water, benzene, benzyl alcohol, 1,4-dioxane, propanol, carbon tetrachloride, cyclohexane, cyclohexanone, methylene chloride, phenol, pyridine, trichloroethane and acetic acid (claim 2), and the volatile solvent is a mixed solvent comprising at least one relatively high-volatility solvent and at least one relatively low-volatility solvent, the relatively high-volatility solvent being selected from the group consisting of acetone, chloroform, ethanol, isopropanol, methanol, toluene, tetrahydrofuran, water, benzene, benzyl alcohol, 1,4-dioxane, propanol, carbon tetrachloride, cyclohexane, cyclohexanone, methylene chloride, phenol, pyridine, trichloroethane and acetic acid, the relatively low-volatile solvent being selected from the group consisting of N,N-dimethyl formamide (DMF), dimethyl sulfoxide

(DMSO), N,N-dimethylacetamide (DMAc), 1-methyl-2-pyrrolidone (NMP), ethylene carbonate (EC), propylene carbonate (PC), dimethyl carbonate (DMC), acetonitrile (AN), N-methylmorpholine-N-oxide, butylene carbonate (BC), 1,4-butyrolactone (BL), diethyl carbonate (DEC), diethylether (DEE), 1,2-dimethoxyethane (DME), 1,3-dimethyl-2-imidazolidinone (DMI), 1,3-dioxolane (DOL), ethyl methyl carbonate (EMC), methyl formate (MF), 3-methyloxazolidin-2-on (MO), methyl propionate (MP), 2-methyletetrahydrofuran (MeTHF) and sulpholane (SL) [claim 3], as in page 4, paragraph 81.

6. With respect to claim 6, Chu et al. also disclose the content of the polymer used in the preparation of the polymer solution is 0.1 to 40 wt. % based on the content of the solvent, as in examples 1 - 9.

7. Regarding claim 7, Chu et al. further disclose the polymer is selected from the group consisting of: poly(vinylidene fluoride (PVDF), poly(vinylidene fluoride-co-hexafluoropropylene), polyacrylonitrile, poly(acrylonitrile-co-methacrylate), polymethylmethacrylate, polyvinylchloride, poly(vinylidenechloride-co-acrylate), polyethylene, polypropylene, nylon12, nylon-4,6, aramid, polybenzimidazole, polyvinylalcohol, cellulose, cellulose acetate, cellulose acetate butylate, polyvinyl pyrrolidone-vinyl acetates, poly(bis-(2-(2-methoxy-ethoxyethoxy))phosphazene) (MEEP), poly(propyleneoxide), poly(ethylene imide) (PEI), poly(ethylene succinate), polyaniline, poly(ethylene sulphide), poly(oxymethylene-oligo-oxethylene), SBS copolymer, poly(hydroxy butyrate), poly(vinyl acetate), poly(ethylene

Art Unit: 1723

terephthalate), poly(ethylene oxide), collagen, poly(lactic acid), poly(glycolic acid), poly(D,L-lactic-co-glycolic acid), polyarylates, poly(propylene fumalates), poly(caprolactone), biopolymer, coal-tar pitch, petroleum pitch, or copolymer of them, or blend of more than two of them.

8. With regards to claim 10, Chu et al. disclose the collector (3, 9) having its upper part provided with a filtering medium (3), as in page 6.

9. Concerning claim 12, Chu et al. also disclose a thin fiber-structured polymer web made according to claim 1 above, as in pages 1 – 12.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al.

12. Regarding claim 4, Chu et al. (449) have disclosed the limitations of claim 1 above. Although Chu et al. do not disclose the relative humidity in a working space for electrospinning being 0 to 40%, however since the conditions of the method of making the polymer web of Chu et al. is such that there are no rapid solidification of polymer stream thereby forming granule liquid drops as a stream of polymer is emitted from a Taylor cone according to the disclosure of Chu et al. (449), it is considered obvious to one of ordinary skill in the art at the time of the invention that the method of Chu et al. must have at least 0% relative humidity in a working space.

13. Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. in view of Chu et al. (US 2003/0054035).

14. With regards to claim 8, Chu et al. (449) have disclosed the limitations of claim 1 above. Chu et al. fail to disclose the polymer being mixed with an emulsion, or an organic or inorganic powder. Chu et al. (035) teach a similar method of making a thin fiber-structured polymer web of Chu et al. (449), wherein the method includes having a polymer mixed with an emulsion, or an organic or inorganic powder (in the form of organic materials such as bone cells, biopolymers and/or medicinal agents which could be in a granular or powdery form), as in pages 2 – 14. It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the method of Chu et al. (449) by adding the step taught by Chu et al. (035), in order to provide an improved polymer web which can used in practical applications such as in cell

storage devices, drug releasing agent and for diagnostic testing (see pages 2 - 14 of Chu et al. 035).

15. Regarding claim 13, Chu et al. (449) have disclosed the limitations of claim 1 above. Chu et al. fail to disclose a filter is formed by laminating the thin fiber-structured polymer web made according to claim 1. Chu et al. (035) teach a thin fiber-structured polymer web made in the same/similar process as in claim 1 above, wherein a filter is formed by laminating the thin fiber-structured polymer web one on top of another (i.e. making a multi-layer structure or a integrated "single" layer formed of two thin layers of porous polymer web), as in page 3. . It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the method of Chu et al. (449) by adding the step taught by Chu et al. (035), in order to provide an improved polymer web which can used in several practical applications including filtration (removal of unwanted materials), as well as cell storage devices, drug releasing agent and for diagnostic testing (see pages 2 - 14 of Chu et al. 035).

16. Claims 5, 9 - 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. in view of Choi (US 2002/0192468).

17. With regards to claim 5, Chu et al. (449) have disclosed the limitations of claim 1 above. Chu et al. fail to disclose the temperature of the polymer solution being in the range of 40 °C to the boiling point of the solvent during electrospinning. Choi teaches a similar method of

making a thin-fiber structured polymer web to that of Chu et al., the method of Choi includes using a temperature of at least 60 °C during electrospinning, as in claim 21 & page 2. It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the method of Chu et al., by adding the step taught by Choi, in order to provide an improved method for making the polymer web which would provide an obstructed and continuous flow from the spinning die onto a collector to make the polymer web (see page 2 of Choi).

18. Regarding claim 9, Chu et al. (449) have disclosed the limitations of claim 1 above. Chu et al. fail to disclose the collector being an anode or a cathode comprising the materials as claimed in claim 9. Choi further teaches a collector for use in the method of making a thin-fiber structured polymer web similar to that of Chu et al., wherein the collector could be a cathode (as oppositely charged by a generator 25) comprising a carbon material in the form of stainless steel, as in page 3. It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the method of Chu et al., by substituting the collector of Chu et al., with the one by Choi, in order to provide an improved method having an improved fiber collector.

19. Concerning claim 10, Chu et al. (449) have disclosed the limitations of claim 1 above. Chu et al. fail to disclose the collector having its upper part provided with a filtering medium. Choi also teaches the collector having a filtering medium (18, porous mat of paper or fiberglass) provided on the upper part of the collector, as in page 3, paragraph 17. It is

considered obvious to one of ordinary skill in the art at the time of the invention to modify the method of Chu et al., by adding the embodiments taught by Choi, in order to provide an improved method which provides a polymer web with thin diameters/cross-sectional areas but is comparatively stronger and more flexible than those made by other process.

20. With respect to claim 13, Chu et al. (449) have disclosed the limitations of claim 1 above. Chu et al. fail to disclose a filter is formed by laminating the thin fiber-structured polymer web made according to claim 1. Choi teaches a filter being formed by laminating a thin fiber-structured polymer web (with a porous filter substrate of another fiber or a porous paper) made in the same process disclosed by Chu et al., as in pages 1 – 3. It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the method of Chu et al., by adding the step taught by Choi, in order to provide an improved filter element which is stronger and has good adhesion and flexibility and high porous integrity with lower pressure drops, as in page 1 of Choi.

Allowable Subject Matter

21. Claim 11 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Claim 11 recites the limitation “the working

space". There is insufficient antecedent basis for the limitation in the claim, since there has not been any working space mentioned in the base claim 1 prior to this.

22. The following is a statement of reasons for the indication of allowable subject matter: none of the prior art searched and those applied above have disclosed or rendered obvious the step of compulsorily discharging air containing a large amount of solvent to the outside while injecting air into a working space during the electrospinning.

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Application Publications 2002/0089094 (Kleinmeyer et al.) and 2002/0122840 (Lee et al.).

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne S. Ocampo whose telephone number is (703) 305-1039. The examiner can normally be reached on Mondays to Fridays from 8:30 A.M. to 4:30 P.M..

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker can be reached on (703) 308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

26. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

hso
M.S.O.

Walker
W. L. WALKER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700